

L 1141-66

ACCESSION NR: AP5022595

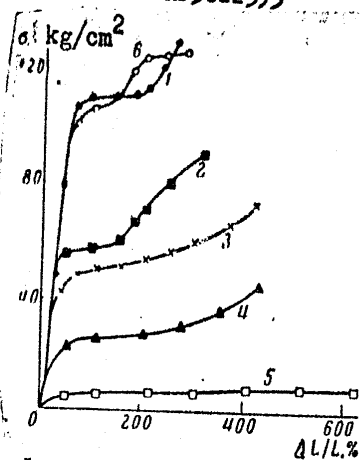


Fig. 1. Elongation curves for gutta-percha and chlorogutta-percha films at 20C. 1- gutta-percha; 2 - 5- chlorogutta-percha containing 5.8, 14.8, 26.0, 52.0% of Cl respectively; 6- gutta-percha film (5.8 Cl) after annealing

Card 3/3

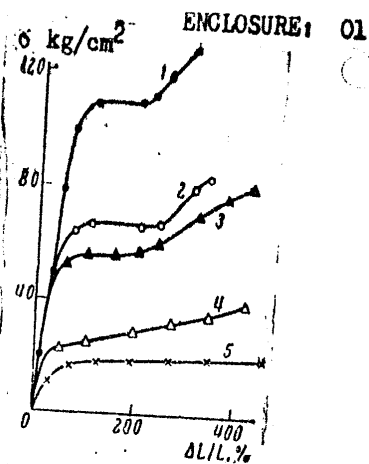


Fig. 2. Elongation curves for gutta-percha at 20C. 1- gutta-percha; 2 - 5- bromogutta-percha containing 13.3, 16.5, 20.2, 27.2% of Br respectively

L 11/1-66  
ACCESSION NR: AP5022595

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im M. V. Lomonosova (Moscow  
State University) 44

SUBMITTED: 02Oct64

ENCL: 01

SUB CODE: 00

NO REF SOV: 007

OTHER: 002

Card 2/3

L 1141-66 EWT(m)/EPF(c)/EWP(j) RM  
ACCESSION NR: AP5022595

UR/0190/65/007/009/1526/1528  
678.01:53+678.76

44 44 44 44 30  
AUTHORS: Tran Kh'yeu; Plate, N. A.; Shibayev, V. P.; Kargin, V. A.

15  
TITLE: Effect of the chemical irregularity of trans-1,4 polyisoprene on its structural and mechanical properties

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 9, 1965, 1526-1528

44  
TOPIC TAGS: polyisoprene, polymer, resin rubber, crystalline polymer

ABSTRACT: This investigation is an extension of the work on gutta-percha reported previously by the authors (Vysokomolek. soyed. 6, 231, 1964). Mechanical properties and electron micrographs of the following chlorinated and brominated specimens of gutta-percha containing 5.8, 14.8, 26, and 52% of Cl and 13.3, 16.5, 20.2, and 27.2% of Br respectively were determined. The mechanical properties were studied by means of a Polyani dynamometer. The experimental results are shown in Figures 1 and 2 on the Enclosure. It was found that the transition from the regular to irregular structure leads to degeneration of spherulite structure and to formation of a ribbon-like structure typical of rubbery polymers. Orig. art. has: 2 graphs and 11 photographs.

Card 1/3

L 1140-66

ACCESSION NR: AP5022594

ENCLOSURE: 01

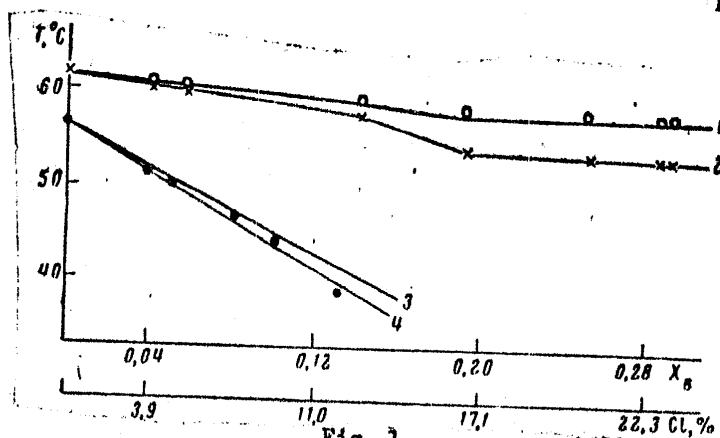


Fig. 1.

Dependence of melting point of gutta-percha ( $T_{mp}$  and  $T'_{mp}$ ) on the number of chlorinated linkages ( $X_B$ ) for hetero and homo-geneous chlorination of specimens ( $X_B$  - mole fraction of chlorinated linkages in gutta-percha). 1, 2 -  $T_{mp}$  and  $T'_{mp}$  - of heterogeneously chlorinated specimens, determined before and after the melting of  $\alpha$ -gutta-percha respectively; 3- theoretical curve calculated after Flory; 4- experimental curve

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L 1140-66

ACCESSION NR: AP5022594

chlorine or 3-4 atoms of bromine per 100 atoms of carbon leads to a lowering of the melting point temperature of gutta-percha in agreement with Flory's theory. An increase in the Cl or Br content, up to 30 or 40% respectively, causes complete amorphization of gutta-percha. The introduction of more than 12% Cl facilitates the  $\alpha$  to  $\beta$  transition in gutta-percha. Orig. art. has: 2 tables, 1 graph, and 2 equations.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 020ct64

ENCL: 01

MT,

NO REF SOV: 006

SUB CODE: 00

OTHER: 004

Card 2/3

L 1140-66 EWT(m)/EPF(c)/EWP(j) RM  
ACCESSION NR: AP5022594

UR/0190/65/007/009/1520/1525  
678.01:53+678.481

AUTHORS: Plate, N. A.; Tran Kh'yeu; Shibayev, V. P.; Kargin, V. A.

TITLE: Structural transformation in gutta-percha due to disturbance of the chemical regularity of the chain

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 9, 1965, 1520-1525

TOPIC TAGS: rubber, resin, polymer, gutta percha, chlorinated polymer, polyisoprene, chlorine, bromine

ABSTRACT: The influence of the degree of irregularity in polymer chains on the crystallization, structure formation, and certain physico-chemical properties of polymers was studied. The substance investigated was trans-1,4-polyisoprene (gutta-percha). Irregularity of the chain was realized by partial chlorination and bromination. Halogenation was accomplished under homogeneous and heterogeneous conditions. X-ray analysis of halogenated gutta-percha specimens was carried out, and the results are given in tabular form. The effect of halogenation on the melting point has been investigated and the results are given graphically in Fig. 1 on the Enclosure. It was found that introduction of 5-6 atoms of

Card 1/3

PLATE, N.A.; TRAN KH'YEU; SHIBAYEV, V.P.; KARGIN, V.A.

Structural transformations in gutta-percha when the chemical regularity of the chain is disturbed. Vysokom. soed. 7 no.9: 1520-1525 S '65.

Effect of the chemical irregularity of trans-1,4-polyisoprene chains on its structural and mechanical properties. Ibid.: 1526-1528 (MIRA 18:10)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.

**A** I 9222-66 EWT(m)/EWP(j)/T RM

ACC NR: AP6000984 SOURCE CODE: UR/0286/65/000/022/0059/0059

INVENTOR: <sup>44.55</sup>Plate, N. A.; <sup>44.55</sup>Mal'tsev, V. V.; <sup>44.55</sup>Kolesnikov, G. S.; <sup>44.55</sup>Davydova, S. L. <sup>44.55</sup>41

ORG: none B

TITLE: Preparation of <sup>7</sup>organotin and <sup>7</sup>organogermanium polymers. Class 39, No. 176408 15

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 22, 1965, 59

TOPIC TAGS: organotin compound, organogermanium compound, <sup>44.55</sup>polymer, catalytic polymerization, lithium compound

ABSTRACT: An Author Certificate has been issued for a preparative method for organotin or organogermanium polymers with enhanced heat resistance. The method involves polymerization of tin or germanium vinyl derivatives over alkyl lithium catalyst. [B0]

SUB CODE: 07/ SUBM DATE: 18Sep63/ ATD PRESS: 4158

Card *gc* UDC: 678.745.7



DAVYDOVA, S.L.; PURINSON, Yu.A.; LAVRUKHIN, B.D.; PLATE, N.A.

Synthesis of optically active unsaturated silanes and alkenes. 16.  
an asymmetric. silicon atom. Izv. Ak. Nauk Ser. Khim. 1965, 2417-2527  
'65. (MIRA 1965)

1. Institut neftekhimicheskogo sinteza Im. A.V. Topchiyeva AN SSSR.

KARGIN, V.A., akademik; AZORI, M.; PLATE, N.A.; BANDURYAN, S.I.

Direct electron microscope observation of polymerization processes  
in crystal monomers. Dokl. AN SSSR 154 no.5:1157-1159 F'64.  
(MIRA 17:2)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.

L 25106-65

ACCESSION NR: AP5001768

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

0  
SUB CODE: MT, GC

NR REF SOV: 020

OTHER: 015

Card 3/3

L 25106-65

ACCESSION NR: AP5001768

bonds(side groups) was found decisive for the chain formation in stereo-specific polymerization and for the different behavior of chemically identical but spatially differing polymers. Examples are given for hydrolysis, such as that of polyvinylacetate of syndiotactic and isotactic structure, reactions in dilute solutions, cyclization processes, dehydrochlorination, as that of polyvinylchloride which is facilitated by a syndiotactic structure of the polymer. In the solid state, reactivity is determined by the close packing of molecules, their adhesive properties<sup>5</sup> and the steric factor of crystalline substances. Intermolecular interaction is particularly important for the reactivity of polymers with rigid chains (e. g. hydroxy-groups in cellulose). In thermodynamic calculations, the decreased chemical reactivity of the structured polymer has to be taken into account, i. e. the energy required to destroy the ordered structure. Changes in electro-physical properties of systems with conjugated bonds may be explained by the presence or absence of crystallization; the latter may be obtained by adding side groups. Non-structured polymers are the exception rather than the rule. The importance of this fact is shown on various examples in liquid as well as solid polymers, e. g. rubber vulcanization seems to proceed at the submolecular rather than the molecular level. Orig. art. has: no graphics

Card 2/3

L 25106-65 BWT(m)/EPT(c)/EPR/ENP(j)/T/ENP(v) Pc-l/Pr-l/Ps-l Ww/RM

ACCESSION NR: AP5001768

S/0063/64/009/006/0654/0660

AUTHOR: Kargin, V. A. (Academician); Plata, N.A. (Candidate of chemical sciences)

TITLE: The role of structure in chemical transformations of polymers

SOURCE: Vsesoyuznoye khimicheskoye obshchestvo. Zhurnal, v. 9, no. 6, 1964, 654-660

TOPIC TAGS: submolecular polymer structure, polymer spacial microstructure, stereospecific polymerization, rubber vulcanization, conjugated bond system

ABSTRACT: This is a survey of literature on the influence of specific physical structure in polymers upon chemical reactions. It is shown that the character of structural formation in the macromolecule may determine the direction of chemical processes in polymers and vice versa. Thus polymers with different microstructures of isotactic, syndiotactic or other spatial sequence of members are diastereomers with essentially different properties. This is particularly apparent in reactions where functional groups of the macromolecule may influence reactions of adjoining groups; thus the interaction of substituents unconnected by valence

Card 1/3

L 25105-65  
ACCESSION NR: AP5001767

rarely and only for a limited range of polymer component (if the inhibitor does not exceed 20-30 mol%) crystallization may occur if isomorphic substitution can be accomplished. The isomorphism of monomer members differs from the known forms in that it refers to a specific part of the molecule rather than the whole, i.e. to members linked by chemical bonds. According to the classification by Natta, 3 types of such isomorphism have been detected so far. Their influence on polymer properties is discussed. Orig. art. has: 10 formulas and 1 figure

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

SUB CODE: MT, GC

NR REF SOV: 050

OTHER: 148

Card 8/8



L 25105-65

ACCESSION NR: AP6001767

sible to direct the crystallization processes of polymers and create the required submolecular structures. The theory of polymer crystallization with irregular structure of the chain [Flory, J. Chem. Phys. 38, 17, 223 (1949)] is applied to systems with branched or grafted polymers, by considering the branches as a secondary component of the system, and is mathematically developed. These formulas may be used to determine the crystallizability of the polymer and to calculate the melting temperatures of copolymers in a limited range of compositions. Crystallization of branched polymers and graft polymers, of linear copolymers (statistic, block, stereoblock and regularly alternating) and isomorphic substitution in copolymers is discussed in detail. The introduction of a few butyl or amyl groups into regular branched polymers will hinder crystallization for steric reasons and reduce the melting temperature. In irregular branched polymers, short branches are assumed to reduce melting temperature and crystallizability; long, frequently occurring branches may permit structural formations. In graft copolymers the crystallization properties of either component have to be considered; molecularly grafted and heterogeneously grafted polymers are discussed. Crystallization of the former is assumed to be determined by the length and frequency of backbone and branches. While irregular polymers crystallize

Card 2/3

L 25105-65 DT(n)/DT(e)/DT(f)/DT(g)/T Po-4/Pr-4/Pa-4 IFL WM/RM  
ACCESSION NR: AP0001787 S/0083/04/009/006/0837/0853

AUTHOR: Plate, N. A. (Candidate of chemical sciences); Shibayev, V. P.  
(Candidate of chemical sciences)

TITLE: Structural formations and crystallization in irregular polymer systems

SOURCE: Vsesoyuznoye khimicheskoye obshchestvo. Zhurnal, v. 9, no. 6, 1964, 637-658

TOPIC TAGS: submolecular structural polymer formation, irregular polymer system, polymer crystallization, branched polymer, grafted polymer, linear copolymer, polymer isomorphism

ABSTRACT: This is a survey of known data organized from the following point of view: destruction of the regular structure of polymer chains will frequently lead to considerable changes in crystallizability of the polymer, which will be evidenced in its physico-mechanical properties. Determination of the specific relationship between the degree of regularity or non-regularity in the structure of the polymer chains, their crystallizability and the character of the submolecular structures which determine the useful features of the polymer would make it pos-

Card 1/3



L 16325-65

ACCESSION NR: AP4049165

mixture of monomers. The potentiometric titration curves of saponified copolymers of potassium acrylate and acrylamide of the same composition obtained under homogeneous and heterogeneous conditions show that the dissociation constants (pK) of the acids for the copolymers obtained under different conditions have different values. For heterogeneous copolymerization:  $pK = 4.4597$ ; for homogeneous copolymerization,  $pK = 4.2760$ , i.e.  $\Delta pK$  is equal to 0.1837. The same conclusions as to the different structure of the chains can be drawn from the specific viscosity of the two types of polymer solutions plotted against the pH of the medium. The regulating effect of the heterogeneous catalyst leads to the formation of copolymers which have a different chain microstructure than the copolymers of the same chemical composition, but obtained under homogeneous conditions. Orig. art. has: 3 tables, 4 figures and 3 formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University)

SUBMITTED: 24Jan64

ENCL: 00

SUB CODE: OC

NO REF SOV: 003

OTHER: 000

Card 3/3

L 16325-65

ACCESSION NR: AP4049155

on copolymerization of potassium acrylate and acrylamide (1:4 by weight) with different initiators, such as magnesium peroxide, hydrogen peroxide in the presence of magnesium oxide, a redox system of lead chromate and sodium thiosulfate hydrogen epoxide, or ultra-violet light show that the copolymer contains a larger amount of acrylate (by 10%) than after homogeneous polymerization, while the results agree well for the three different heterogeneous and homogeneous systems. This shows the independence of the composition of the copolymer of the type of initiator under the conditions of the same reaction mechanism and equilibrium constants of copolymerization. Other experiments with hydrogen peroxide over magnesium oxide also confirmed that the peculiarities of the copolymerization under heterogeneous conditions are correlated with the effect of the solid surface of the catalyst on chain propagation rather than with its initiating effect. The copolymerization of potassium acrylate and acrylamide in the presence of potassium propionate showed that potassium propionate is adsorbed onto the magnesium oxide, removes the acrylate from the surface of the latter and affects the composition of the copolymer. During the copolymerization of potassium acrylate and acrylamide under homogeneous and heterogeneous conditions, the equivalent values of the copolymerization constants  $r_1$  and  $r_2$  vary. They are 1.35 and 0.78 (in the heterogeneous process) or 0.84 and 1.4 (in the homogeneous process). This leads to copolymers of different chemical composition from the same

Card 2/3

L 16325-65 EWT(m)/EPF(c)/EPR/ENP(j)/T Pc-4/Pr-4/ps-4 RPL/ESD(gs)/  
 ESD(t)/ASD(m)-3 WW/RH  
 ACCESSION NR: AP4049155 S/0190/64/006/011/2040/2045

AUTHOR: Kargin, V. A.; Plata, N. A.; Patrikeyeva, T. I.

TITLE: Copolymerization of potassium acrylate and acrylamide under heterogeneous conditions

SOURCE: Vy\*sokomolekulyarny\*ye soyedineniya, v. 6, no. 11, 1964, 2040-2045

TOPIC TAGS: potassium acrylate, acrylamide, copolymerization, acrylic copolymer, magnesium peroxide, hydrogen peroxide, lead chromate, hydrogen epoxide, polymerization initiator, heterogeneous polymerization, polymerization catalyst, ultraviolet light

ABSTRACT: The copolymerization of potassium acrylate and acrylamide in aqueous solutions induced by an insoluble radical initiator was investigated. A study of the peculiarities of the polymerization of acrylic monomers under heterogeneous conditions showed that the solid surface of the catalyst adsorbing the monomer molecules and initiating the polymerization has a regulating effect on the elementary reaction of chain growth. Water-insoluble inorganic peroxides and salts capable of redox reactions with the formation of free radicals were used as heterogeneous catalysts and water-soluble acrylamide and acrylates were used as monomers. The experimental procedure is described. The tabulated data

SHIBAYEV, V. P.; PLATE, N. A.; KARGIN, V. A.

"Processes of structure formation in some long chain polymers."

report submitted for 3rd European Conf on Electron Microscopy, Prague, 2 Aug-  
3 Sep 1964.

Chair of Molecular Weight Compounds, Moscow State Univ

SHIBAYEV, V.P.; PLATE, N.A.; TRAN K'YEU; KARGIN, V.A.

Structural and mechanical study of isotactic and syndiotactic  
polystyrene graft copolymers. Vysokom. soed. 6 no.1:107-  
111 Ja'64. (MIRA 17:5)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

ACCESSION NR: AP4017633

that the chlorinated polyethylene compounds obtained at 115 and 125C were not homogeneous in their composition, the cold chlorobenzene soluble fraction containing 14.0 and 17.9% of chlorine, while the chlorobenzene insoluble fraction contained 8.2 and 7.0% of chlorine, respectively. Only at a reaction temperature of 130C, which corresponds to the melting point of the crystalline polyethylene, did the chlorinated product become fully soluble. The samples of polyethylene containing up to 8% chlorine possessed the ability to crystallize and to form spherulites and monocrystals, while the samples with a higher chlorine content revealed structures indicating a gaseous-crystalline state. At a 50% chlorine content the polyethylene acquired an amorphous structure. Orig. art. has: 1 chart, 2 tables, 8 electron-microscope pictures, and 1 x-ray picture.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 01Nov62

DATE ACQ: 23Mar64

ENCL: 00

SUB CODE: CH

NO REF SOV: 008

OTHER: 010

Card 2/2

ACCESSION NR: AP4017633

S/0190/64/006/002/0231/0236

AUTHORS: Shibayev, V. P.; Plate, N. A.; Grushina, R. K.; Kargin, V. A.

TITLE: Structuration in chlorinated polyethylene and its solutions

SOURCE: Vyssokomolekulyarnyye soyedineniya, v. 6, no. 2, 1964, 231-236

TOPIC TAGS: polymer, polymer structure, polyethylene, chlorinated polyethylene, supermolecular structure, chlorobenzene solution, crystalline structure, gaseous crystalline state, spherulite, bundle, amorphous state, primary morphological form, ordered morphological form

ABSTRACT: A high-crystalline fraction of polyethylene was used (molecular weight of 260 000) which was obtained by removing the low-molecular fractions by boiling in carbon tetrachloride and double recrystallization in chlorobenzene. The samples were chlorinated by means of a saturated solution of chlorine at 115, 125, and 130C, under incandescent lamplight. The resulting products were either fully or partly soluble in chlorobenzene (the insoluble part was purified by methanol precipitation from toluene solutions). Polyethylene samples with a chlorine content of 3 to 50% were obtained: these were subjected to x-ray and electron microscopic studies in m-xylene solutions and in crystalline structures obtained therefrom. It was found

Card 1/2

CHICHIBABIN, Aleksey Yevgen'yevich. Prinsipy uchastiye: REUTOV, O.A.; KITAYGORODSKIY, A.I., prof.; LIBERMAN, A.L., doktor khim. nauk; BAGDASAR'YAN, Kh.S., doktor khim. nauk; PLATE, N.A., kand. khim. nauk; KOLOSOV, M.N., kand. khim. nauk; BOTVINIK, M.M., doktor khim. nauk; STEPANOV, V.M., kand. khim. nauk; MEL'NIKOV, N.N., prof.; DEREVITSKAYA, V.A., doktor khim. nauk; LIBERMAN, A.L., red.; SERGEYEV, P.G. [deceased]; ROMM, R.S., red.; SHPAK, Ye.G., tekhn. red.

[Basic principles of organic chemistry] Osnovnye nachala organicheskoi khimii. Izd.7. Pod red. P.G.Sergeeva i A.L. Libermana. Moskva, Goskhimizdat. Vol.1. 1963. 910 p. (MIRA 16:10)

1. Chlen-korrespondent AN SSSR (for Reutov).  
(Chemistry, Organic)



L 12429-63

ACCESSION NR: AP3001169

polyester was subjected to a polymerization reaction with methacrylic acid, yielding the desired copolymer of 1:1 ratio. The latter was studied by electron microscope and x-rays, following annealing at 60-130C and was found to be amorphous. When, however, the annealing temperature was raised to 145-150C, there appeared in the side chains of the copolymer fibrillar structures with filaments of 100 Angstrom in diameter. Thus, the existence of a chemical bond between the two polymers seems to interfere with the crystallization of polyhydroxypelargonate. Thanks are given to G. S. Kolesnikov for supplying the graft copolymers. Orig. art. has: 3 figures and 3 formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 06Jan62

DATE ACQ: : 01Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 010

OTHER: 000

Card 2/2

L 12429-63 EPR/EWP(j)/EPF(e)/EWT(n)/HDS ASD Pc-4/Ps-4/Pr-4 RM/WW  
 ACCESSION NR: AP3001169 S/0190/63/005/006/0932/0937

AUTHOR: Shibayev, V. P.; Flate, N. A.; Zezina, L. A.; Kargin, V. A.

TITLE: The processes of structure formation in a graft copolymer on the basis of a crystallizing polyester

SOURCE: Vy\*sokomolekulyarny\*ye soyedineniya, v. 5, no. 6, 1963, 932-937

TOPIC TAGS: lattice formation, graft copolymer, polyester, polyhydroxypelargonate, macromolecules, polymethacrylic acid

ABSTRACT: In earlier publications the authors investigated copolymeric systems where the basic chain consisted of a crystallizing homopolymer, while the side grafts were of the noncrystallizing type. They demonstrated that the crystallization of the homopolymer was prevented, having stopped at the fibrillar type stage. The purpose of the present investigation was to find out whether in a copolymeric system consisting of a crystallizing and an amorphous polymeric components, grafted in the reverse order, a similar inhibitory effect would take place. In this case methacrylic acid/polymer formed the basic chain, while crystalline polyoxypelargonate constituted the grafted side chains. Macromolecules of polyoxypelargonate were treated with methacrylchloride, and the resulting unsaturated

Card 1/2

L 18512-63

ACCESSION NR: AP3001805

containing an optically active alkyl group, or the use of an optically active cocatalyst, which permits the polymerization of cyclic unsaturated esters of the benzofurane type into an optically active polymer. It is pointed out that optically active polymers possess a higher melting point as compared with their crystalline razemic analogues.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 15Jul63

ENCL: 00

SUB CODE: OH

NO REF SOV: 000

OTHER: 000

Card 2/2

L 18512-63

EPR/EWP(j)/EPF(c)/EWT(m)/BDS

AFFTC/ASD

Ps-L/Pc-L/Pr-L

RM/WW/WH/MAY

ACCESSION NR: AP3001805

S/0030/63/000/006/0056/0060

AUTHOR: Plate, N. A. (Candidate of Chemical Sciences)TITLE: Synthetic optically active polymers <sup>15</sup> 74SOURCE: AN SSSR. Vestnik, no. <sup>33</sup> 6, 1963, 56-60 72

TOPIC TAGS: optical rotation, synthetic polymer, asymmetry, macromolecule, stereospecific polymerization, polymeric chain, cocatalyst, functional group

ABSTRACT: This paper presents a brief review of the chemistry of optically active synthetic high polymers, which several Soviet institutions of the Academy of Sciences have begun to study only since 1961. The importance of this field is especially stressed in connection with the synthesis of macromolecules, where the presence of asymmetric atoms permits an insight into the mechanism of synthesis by optical means and its strict control. The author discusses how optically active polymers can be synthesized, such as by polymerization and polycondensation of monomers containing an asymmetric atom or by copolymerization of an optically active monomer with a di-substituted one. The list of other methods includes polymerization of substituted dienes in the 1,4 position, the use of a catalyst

Card 1/2

PLATE, N.A., KARGIN, V.A.

The mechanochemical reactors of polymerization and degradation at low temperatures.

Report submitted at the International Symposium of Macromolecular Chemistry  
Paris, 1-6 July 63

Mechanicochemical polymerization...

2/020/62/142/146/144/143  
B106/3101

shows optimum reactivity during polymerization. Chain breaking also occurs from defects, not through recombination of radicals, since the molecular weight of PMAA proved to be practically independent of temperature ( $[\eta]_{+20^{\circ}\text{C}} = 0.15$ ;  $[\eta]_{-150^{\circ}\text{C}} = 0.17$ ). Suppression of polymerization by hydroquinone indicates the radical nature of the process. There are 3 figures, 1 table, and 8 references: 7 Soviet and 1 non-Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: November 18, 1961

Fig. 2. Polymethacrylamide yield as a function of catalyst concentration.  
Legend: Ordinate: polymer yield; abscissa: salt content; (u) NaCl - MAA;  
(s)  $\text{BaSO}_4$  - MAA; (E) NaCl - MAA - heptane.

Card 4/5

✓

Mechanicochemical polymerization...

C/020/62/142/006/014/010  
B106/0101

ionic salts under the action of mechanical forces and ionized to the accompaniment of emission of electrons. In the case of  $\text{SiO}_2$ , mechanical grinding causes formation of radical centers as a result of the rupture of covalent Si-O-Si bonds. Since the transfer of active centers from the solid phase of the catalyst to the solid phase of the monomer is one act of the formation of macromolecules in the systems mentioned, the affinity of these two solid phases and their mutual wettability are of great importance. Polymerization of MAA in the presence of salts is also satisfactory at low temperatures (down to  $-150^\circ\text{C}$ ). With continuous mechanical grinding of the monomer crystals, the mobility of the molecules on the surface of the solid particles is assumed to come very close to the mobility at the instant of phase transformations. The high conversion degree of the monomer (10 and 49%, respectively, within 45 min) definitely indicates a quick polymerization process. In agreement with this assumption, the polymerization rate in the temperature range of the solid state at constant initiation rate depends only slightly on temperature. This slight temperature dependence leads to a very low activation energy (of the order of 0.1 kcal/mole) for MAA polymerization. The most defective crystal lattice of the monomer, not the ideal crystal,

Card 3/5





2000 年 12 月 15 日

Georgia, U. S., Administration, State, U. S., and Local Government

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

technicochemical synthesis of rubbery polymers in the solid state

1. Источники: Академия наук СССР. Доклады, т. 10, no. 3, 1960, стр. 1-10.

TEXT: The mechanicochemical polymerization of solid methanol is described. Pure table salt, barium sulfate, or quartz sand were used as polymerization catalysts. The weighed sample of recrystallized  $\text{CH}_3\text{OH}$  (m.  $104.0^\circ\text{C}$ ) and the catalyst concerned (5 g in total) was introduced into a steel drum filled with steel balls, and the drum set in vibration in an eccentric vibration mill of laboratory scale according to a method described earlier (N. A. Pluta, V. I. Prokopenko, V. A. Kargin, *Chem. Abstr.*, **1**, 1713 (1959)). The reaction products were separated by mechanical precipitation from aqueous solutions with methanol and by solvent extraction with benzene. Study of the polymerization in the presence of 0.5% NaCl at room temperature showed that after a brief induction period the polymerization rate increased with increasing dispersion time.

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Modification of properties of synthetic ....

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A057/A126

ties have been obtained by intermolecular splitting-off reactions in the main chain.

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# Modification of properties of synthetic ....

out in the last time. A determined orientation of the structure can be realized by anionic polymerization and condensation methods. Regulated surface grafting occurring in particular without formation of homopolymers or without spatial separation of the latter are investigated at the present time, especially in preparation of grafted copolymers, by studying relations between macroproperties of these copolymers and structure of the macromolecule. Surface grafting of polymers was also developed recently. Experiments in modification of surfaces of oxides, or of metals by grafting with organic polymers were carried out by Soviet scientists in recent years and also a new method for the preparation of polymer-polymer systems of the "sandwich" type was developed. Functional reactive groups are necessary for chemical modification processes, while non-reactive polymers are required to obtain stable polymer products. Several examples (mainly Soviet investigations) are given by the present authors to demonstrate the realization of both requirements. Among these examples there are discussed transformations analogous to polymerization. Thus a new method of PAM production by alkaline hydrolysis of polyvinylsuccinimide is cited. A new type of elastomers was synthesized by introducing an amino group into the polyvinylalcohol chain. Phosphorylation was used to increase the thermal resistivity of polymers. Polymers with conjugated bonds and exceptional electrophysical properties.

## Modification of properties of synthetic ....

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A057/A126

polymer. Changes in supermolecular secondary structures and the relation to mechanical properties of the polymer product are still insufficiently investigated. Thus, Soviet authors observed brittleness of polyethyleneterephthalate fibers effected by the formation of thin surface layers of spheroidal aggregation on the fiber. An interesting combination of structural and chemical modification is the isomorphism in polymer crystallization. The important role of orientation on changes in physical properties can be seen particularly in the production of synthetic fibers, where modification is primarily a problem of structural changes. Copolymerization is the most widely spread method of chemical modification and is employed in two directions - in the one direction the regularity of chain structure in high melting crystalline polymers is destroyed in order to relieve processing of these materials (as for polyolefines), in the other direction low active monomers are used to prepare polymers in an "indirect manner". It is possible that in the future copolymerization will be used instead of the common preparation methods to synthesize polymers, which are hard to prepare from low molecular weight compounds. Best possibilities in modification of polymers are given principally in graft and block-copolymerization methods. The theory of modification by these methods is only at the very beginning now. Hence, thorough studies of the mechanism of these reactions were carried

0/063/00/007/002/004/01-  
1037/1126

AUTHORS: Plato, N.A., Candidate of Chemical Sciences; Shibayev, V.P.  
TITLE: Modification of properties of synthetic polymer materials  
PERIODICAL: Zhurnal vsesoyuznogo khimicheskogo obshchestva im. D.I. Mendeleeva,  
v. 7, no. 2, 1962, 147 - 153

TEXT: Problems of structural modification and the development during the last 2 - 3 years in the chemical modification of polymers are discussed in the present paper. Examples are given: Structural modifications are classified into configurational, conformational, and supermolecular types. Stereospecific synthesis is an example for the first type of isomerism, and also the so-called conformational polymerization. The latter allows regulation of chain growth and by this changes in the configuration of the macromolecule, thus modifying properties of grafted polymers. In the second type of structural modification whole form of the macromolecule is changed and with it the physical properties of the product, as in formation of globular, or fibrous polymers. Grafted copolymers of latex and methylmethacrylate, or block-copolymers of styrene and isoprene are classical examples for the conformational modification of the same polymer.

Card 1/4

PLATE, N.A., kand.khimicheskikh nauk

Methods for studying graft and block copolymers. Zhur.WENO 6  
no.4:422-427 '61. (MIRA 14:7)

(Polymers)

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Moskowsky graduated from the University of Maryland (Maryland State University) from the M. V. I. program.

November 19, 1960

Card 5/5

Processes of polymerization ... S/190/61/003/007/016/021  
2.272 B101/B226

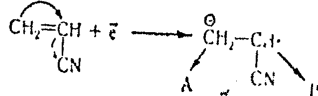
dispersion also could have an initiating effect. In the system Mg-methyl methacrylate, a highly swelling polymer was obtained, a metal-polymer gel, the lattice points of which consist of metal particles being bound to the polymethyl methacrylate by means of Me-O-C bonds. When treating these polymers with HCl, the molecular weight decreased (from 74,000 to 30,000 in the system with Al; from 250,000 to 160,000 in the system with Mg). Therefrom, conclusion is drawn that a hydrolysis of Me-O-C bonds had taken place. Attempts to polymerize styrene or methyl methacrylate by dispersing metallic Cr or W were unsuccessful. The too high work function of these metals is considered to be the cause of this fact. The capability of initiating polymerization thus does not depend on the absolute strength of interatomic bonds in the crystal, but on the capability of forming active centers of the electron donor- or radical type. (C) Polymerization by dispersion of salts (NaCl, KCl,  $\text{CaF}_2$ ) already took place at room temperature in methyl methacrylate, acrylonitrile, styrene, and  $\alpha$ -methyl styrene. Assumption is made that also in this case initiation takes place by transferring an electron to the monomer. The electron might be set free by ionization- or crystal defects of the F-center type. Dispersion of  $\text{TiCl}_3$  or  $\text{BeCl}_2$  in the presence of styrene led to its rapid

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Processes of polymerization ... 25272 S/190/61/003/007/016/021  
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and the active centers are blocked. (B) Polymerization in the presence of Fe, Al, and Mg easily succeeded in acrylonitrile and methyl methacrylate between - 30 and + 50°C. The results did not differ from the data obtained earlier for styrene - SiO<sub>2</sub> and styrene - NaCl. Considering the polymerization mechanism of acrylonitrile, assumption is made that in the metal surface electrons are excited, which, at low work function ( $W_{Fe} = 4.31$  ev,  $W_{Al} = 4.2$  ev,  $W_{Mg} = 2.74$  ev) pass over to the monomer adsorbed on the metal surface, and release the reaction according to the following scheme:



A denotes the possibility of chain growth according to anionic mechanism, P according to radical mechanism. Besides, in the presence of Fe, complex formation of Fe with nitrile groups and formation of cyclic groups is assumed for acrylonitrile. Furthermore, account has to be taken of that the metals are covered by an oxide film. On the oxide film, a grafting of the resulting polymer could appear, and separation of the Me-O bonds during

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by a. e. (3) The ampuls were fastened to the coil of an electromagnetic 10-w loudspeaker. The use of vacuum and different temperatures was made possible by working with ampuls. Frequency was varied between 50 and 120 cps, the amplitude being 2-5 mm. Duration of dispersion amounted to 30 - 90 min. (A) Polymerization by means of  $\text{Al}_2\text{O}_3$  (corundum, energy of crystal lattice 3610 kcal/mole) or  $\text{Cr}_2\text{O}_3$  ( $E_{\text{Cr}_2\text{O}_3} = 4668$  kcal/mole) was

studied with styrene, methyl methacrylate, acrylonitrile, vinyl acetate, and some organic substances of the acetaldehyde type. Intensive dispersion of these oxides in the presence of styrene or methyl methacrylate led to rapid polymerization. In the case of methyl methacrylate, a polymer having a molecular weight of 25,000 was obtained. Vinyl acetate was not polymerizable. When dispersing corundum, acetaldehyde yielded, after 2 hr, 5-6% polyacetaldehyde. Also in this case, the results were not different from those obtained by J. Furukawa et al. (see below) by means of  $\text{Al}_2\text{O}_3$  annealed at 600°C. Dispersion of corundum

in acetone under exclusion of air resulted, at room temperature, in small quantities of mesityl oxide and phorone. No high yields could be obtained, since the resultant  $\text{H}_2\text{O}$  is adsorbed on the surfaces of  $\text{Al}_2\text{O}_3$ .

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25272

S/90/61/003/007/016/02:  
B'01/3226

AUTHORS: Kargin, V. V., Plate, N. A., Litvinov, I. A., Shibayev, V. P., Lar'ye, Ye. G.

TITLE: Processes of polymerization and grafting on newly formed surfaces of inorganic substances

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 7, 1961, 1091 - 1099

TEXT: In previous papers (Vysokomolek. soyed., 1, 339, 1959; ibid., 1, 1713, 1959), the authors had shown that polymerization of vinyl monomers can be initiated by an intensive mechanical dispersion of solid inorganic substances. The present paper studies this effect when dispersing metals, metal oxides, and ionic salts. Because in the hitherto used vibration mill grindings of iron balls had a disturbing effect upon the polymerization processes, three new grinding devices have been constructed. (1) The monomer, the substance to be dispersed, and glass balls were filled into an ampul being fastened to the vibration mill. (2) The ampuls were fastened to the armature of an electromagnet which was fed

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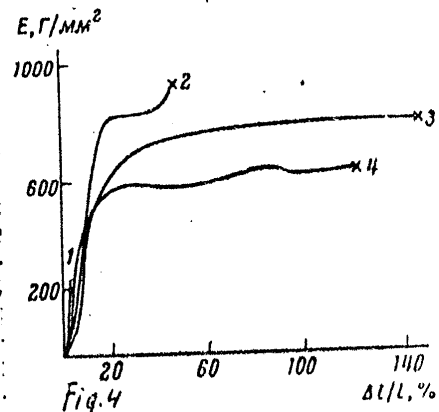
21139  
S/190/61/003/004/014/014  
B101/B207

Structure and ...

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University im. M. V. Lomonosov)

SUBMITTED: October 8, 1960

Fig. 4: Force-elongation diagrams at 25°C. Legend: 1) Mechanical mixture from dispersed PE and carbon black 7 : 1; 2) product of joint PE and carbon black dispersion, 7 : 1; 3) initial PE; 4) PE, dispersed without carbon black.



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Structure and ...

copolymer and PE. Fig. 4 gives the result of the mechanical test by means of Polyani dynamometer. The graft copolymer showed a higher elasticity than the mechanical mixture. Moreover, the resistivity of the toluene solution of the graft copolymer was at 70°C twice as high as that of the mechanical mixture. Thus, the contact between the channel black particles was reduced due to their chemical bonding to PE. Since in dispersion of PE, its molecular weight was not reduced, it is assumed the newly formed carbon black surfaces react with the macromolecules of PE. The results are compiled as follows: 1) Slight quantities of graft copolymer form in the joint vibratory grinding of PE and carbon black. 2) This homogenized system does not dissolve into its components when left standing. 3) Thus, it is possible to introduce large quantities of carbon black into PE. 4) Highly elastic products are, however, likely to be obtained only by subsequent vulcanization. T. A. Koretskaya is mentioned. There are 4 figures and 6 references: 4 Soviet-bloc and 2 non-Soviet-bloc. The 2 references to English-language publications read as follows: E. Dannerberg et al., J. Polymer Sci., 31, 127, 1958.

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## Structure and

equal to 1 : 1, 2 : 1, 5 : 1, and 7 : 1. The mixture formed was treated with hot benzene. A fine carbon black suspension formed in the PE solution from which, when cooled, PE adsorbed the entire carbon black into the precipitate. When introducing a paper filter into the 1% hot solution of carbon black containing PE in p-xylene, a 4 cm broad continuous transition from black to colorless was observed, while a mechanical mixture from separately dispersed carbon black and PE showed a clear borderline of carbon black separation on the filtering paper; thus, from the formation of a chemical compound consisting of PE and carbon black at codispersion is assumed. Study by means of a JEM-5Y electron microscope, 30,000-60,000 fold magnification, of samples obtained by evaporation of the 0.01% solution of the polymer in p-xylene showed that, beside aggregates of non-reacted carbon black and the spherulites of PE, also packed structures had been formed. A mechanical mixture from separately dispersed PE and carbon black showed only carbon black aggregates and PE spherulites. It is concluded that PE crystallization is inhibited by the presence of the graft polymer from PE and carbon black. The packed structures form in such a way that the carbon black particles chemically linked with PE, are located in the interpacked space and cause plastification of PE. X-ray analysis showed no difference between

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15.8101 2209.1573.11407 S/190/61/003/004/014/014  
B101/B207

AUTHORS: Kargin, V. A., Plate, N. A., Zhuravleva, V. G.,  
Shibayev, V. P.

TITLE: Structure and properties of the product of codispersion  
of polyethylene and carbon black

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 4, 1961,  
650-654

TEXT: The authors aimed at preparing a graft copolymer from polyethylene (PE) and carbon black, and at investigating its physical properties. They proceeded from the assumption that in the mechanical dispersion of carbon black on newly formed surfaces active centers develop which react with the macroradicals formed by dispersion of PE. The experiments were carried out with ISAF carbon black, with a specific surface of 100 m<sup>2</sup>/g, and PE of high density, whose intrinsic viscosity in decaline was equal to 1.1 at 100°C. Dispersion was performed for 1.5 hr by means of a vibratory mill at room temperature. The method has already been described in Ref. 2 (N. A. Plate et al., Vysokomolek. soyed., 1, 1713, 1959). The ratio PE: carbon black was

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benzene rings in the radiolysis of polystyrene. Discussion sessions concentrated on: 1) interface polycondensation; 2) heat resistance of polymers, polymers with magnetic properties; 3) mechanism of ionic polymerization; 4) mechanism of stereospecific polymerization; 5) problem of emulsion polymerization; 6) chemistry of cellulose; 7) grafted copolymers; 8) polymerization of monomers in solid state. The following Soviet-bloc scientists participated in these discussions: A. A. Berlin, V. L. Tal'roze, V. P. Parini, L. A. Blyumenfel'd, S. S. Medvedev (USSR), Z. Zlamal (ČSR), A. R. Gantmakher (USSR), K. Vesely (ČSR), A. I. Shatenshteyn, M. I. Mosevitskiy, K. S. Minsker, V. K. Bykhovskiy, P. M. Khomikovskiy, M. F. Margaritova, G. D. Berezhnaya, Z. A. Rogovin, N. A. Plate, G. S. Kolesnikov, M. S. Akutin, P. V. Kozlov, N. N. Semenov, E. I. Adirovich, V. A. Kabanov, S. S. Urazovskiy, V. V. Voyevodskiy, N. D. Sokolov, S. Z. Roginskiy, M. V. Vol'kenshteyn, Ye. V. Kuvshinskiy, V. I. Gol'danskiy (USSR). It is mentioned that the delegates were satisfied with the results of the symposium, and the level of the Soviet reports was by no means lower, in some specialized fields even higher than those of foreign scientists. ✓

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Z. A. Rogovin, V. A. Derevitskaya, Sun T'ung, Chang Wei-kang, L. S. Gal'-braykh (USSR): synthesis of cellulose ethers. I. N. Yermolenko, F. N. Kaputskiy (USSR): synthesis of phosphorated celluloses. V. I. Ivanov, N. Ya. Lenshina, V. S. Ivanova (USSR): influence of the structure of polyglucoside chains on the oxidative transformation of cellulose. V. M. Yur'yev, A. N. Pravednikov, S. S. Medvedev (USSR): reduced rates of oxidation of hydrocarbons in the presence of formic acid or formates. Thermal destruction of polyvinyl chloride under the action of various compounds had been studied by Z. V. Popova and D. M. Yanovskiy (USSR). O. Wichterle, E. Schittler, P. Čefelin (CSR) reported on the destruction of polycaprolactam. M. Kučera, J. Lanikova, M. Jelinek (CSR): destruction of polydimethyl siloxane. E. Thilo, W. Wicker (Eastern Germany): destruction of inorganic polyphosphates. I. Gemery, O. Mlejnek, E. Štimel (CSR): thermal destruction of polyesters. M. B. Neyman, B. M. Kovarskaya, L. I. Golubenkova, A. S. Strizhkova, I. I. Levantovskaya, M. S. Akutin (USSR): on thermal destruction of epoxy resins. L. A. Angert, A. S. Kuz'minskiy (USSR): initiating effect of secondary amines on the oxidation of rubber. I. Kessler, V. Matysek, J. Poláček (CSR): aging of chloroprene. A. N. Pravednikov, Ying Sheng-k'ang (USSR): protective effect of

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B. E. Davydov, B. A. Krentsel', I. M. Kustanovich, L. S. Polak, A. V. Topchiyev, R. M. Voytenko (USSR): on semiconductor polymers. J. Mikes, L. Kovacs (Hungary): on bipolar ion exchange resins. K. M. Saldadze (USSR) reported on the same subject; Ye. B. Trostyanskaya, I. P. Losev, A. S. Tevlina, S. B. Makarova, G. Z. Nefedova, Lu Hsien-jao (USSR) on the chloromethylation of copolymers of styrene and divinyl benzene. Kh. U. Usmanov, U. N. Musayev, R. S. Tillayev (USSR): on radiation grafting of acrylonitril on polystyrene and polyperchloro-vinyl. I. Szanto, K. Gal (Hungary), Kh. U. Usmanov, B. I. Aykhodzhayev, U. Azizov (USSR) also reported on radiation grafting (acrylonitril on cellulose). M. Lazàr, R. Rado, J. Pavlinec (CSR), G. S. Kolesnikov, Tseng Han-ming (USSR): on grafting by initiators. I. A. Tutorskiy, Z. I. Smelyy, V. M. Bystrov (USSR): on copolymers of butadiene styrene rubber with  $\epsilon$ -caprolactam. A. A. Berlin, Ye. A. Penskaya, G. I. Volkova (USSR): on the formation of starch macroradicals in freezing and melting of aqueous solutions. V. A. Kargin, N. A. Plate (USSR) reported on initiating vinyl polymerization by disperse inorganic substances; R. Rado, M. Lazàr (CSR): polymerization of polyethylene by peroxides. I. Mladenov, I. A. Tutorskiy, B. A. Dogadkin (USSR): action of  $\gamma$ -rays on butadiene styrene rubber.

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methods of determining stereo-characteristics of macromolecules. V. A. Kargin, V. A. Kabanov (USSR): on the polymerization of insoluble, molecular, disperse substances. A. D. Abkin, A. P. Sheynker, M. K. Yakovleva, L. P. Mezhirova, (USSR) on radiation polymerization in liquid phase. The Third Section dealt with problems of chemical transformations in polymer chains. T. Rabek, Z. Kosmider (Poland) reported on the chlorination of phenol-formaldehyde resins by sulfuryl chloride. A. Ya. Yakubovich, T. Ya. Gordon, L. I. Maslennikova, Ye. M. Grobman, K. I. Tret'yakova, N. I. Kokoreva (USSR): on the transformation of polycarbonates. G. I. Kudryavtsev, Ye. A. Vasil'yeva-Sokolova, I. S. Mazel' (USSR): on the interaction of poly- $\alpha$ -chloro-methyl methacrylate by amines. Z. Volkober, T. Holly, G. Turczo (Hungary): on the interaction of substituted aromatic amines by polyvinyl chloride. I. M. Fingauz, A. F. Vorob'yeva, G. A. Shirokova, M. P. Dokuchayeva (USSR): sulfurization of the polymer during alcoholysis of polyvinyl acetate. B. A. Dogadkin, M. S. Fel'dshteyn, E. N. Belyayeva (USSR) reported on vulcanization accelerators. A. A. Berlin (USSR) gave a survey on the polymers with conjugate bonds. A. A. Berlin, V. I. Liogon'kiy, V. P. Parini (USSR) reported on poly-conjugate polymers on the basis of aromatic bisdiazonines. M. A. Geyderikh,

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rate. K. Vesely (CSR) on cationic and anionic polymerization. Z. Zlamal, A. Kazda (CSR) on the effect of non-polar compounds on the cation polymerization of butylene. R. Mihail, J. Gherșkovici (Roumania) on the formation of stereoregular polymers. A. Szimon, Gy. Heims (Hungary) on the polymerization of ethylene in the presence of  $TiCl_4$ ,  $(C_2H_5)_3Al$  or  $(C_2H_5)AlCl$ . O. Wichterle, M. Marek, I. Trekoval (CSR) on Ziegler catalysts for the polymerization of isobutylene. A. V. Topchiyev (USSR) reported on the polymerization on oxide catalysts and experimental data obtained in the int Neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis of AS USSR). V. Boček (CSR) on the propylene polymerization by modified Ziegler catalysts. The effect of organometallic catalysts was also studied by K. Vesely, J. Ambrož, R. Vilim, O. Gamrik (CSR), B. L. Yerusalimskiy, Wang Fo-sung, A. P. Kavunenko (USSR), I. Szanto, K. Hala (Hungary), S. Ye. Bresler, M. I. Mosevitskiy, I. Ya. Poddubnyy, Shih Kuan-i (USSR), B. A. Dolgoplosk (USSR) reported on disturbances in the structure of chains in the ion polymerization of dienes. V. N. Tavetkov, S. Ya. Magarik, N. N. Boytsova, M. G. Okunev, T. M. Birshteyn, Yu. Ya. Gotlib, O. B. Ptitsyn (USSR): on physicochemical

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The International Symposium.....

S/190/61/003/002/012/012  
B101/B215

decomposition of peranhydrides and peresters; A. L. Klebanskiy, O. A. Timofeyev (USSR) on reactions of hexafluoro butadiene-1,3. L. M. Pyrkov, S. Ya. Frenkel' reported on "Hybrid polymers"; D. Hardy, K. Nitray, G. Kovacs, V. P. Li (Hungary) on the kinetics of radical polymerization of vinyl monomers in the presence of  $\text{SiCl}_4$ . T. Krishan, M. F. Margaritova (USSR) talked about emulsion polymerization. A. Ryšánek, M. Hloušek (CSR) reported on the polymerization rate of a particle during emulsion polymerization; F. Hrabek, J. Zahoval (CSR) on the kinetics of emulsion polymerization of chloroprene; E. Turska, G. Wisniewski (Poland) on the redox potential in emulsion polymerization. Z. Maniasek, A. Jerabek (CSR) reported on the emulsion polymerization of styrene and chloroprene; I. Selinger (CSR): on studies on the kinetics of dispersion polymerization. Yu. L. Spirin, D. K. Polyakov, A. R. Gantmakher, S. S. Medvedev (USSR) on polymerization in the presence of organoalkali compounds. A. A. Korotkov, S. P. Mitsengendler, V. N. Krasulin (USSR) on the polymerization of methyl methacrylate in the presence of butyl lithium. M. Kučera, M. Jelinek, J. Lanikova (CSR) on chain ruptures in anionic polymerization of octamethyl cyclotetrasiloxane. Z. Macháček, J. Mejzlik, J. Patz (CSR) reported on the effect of the ratio catalyst : water on the polymerization

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The International Symposium...

S/190/61/003/002/012/012  
B101/B215

M. V. Vol'kenshteyn (USSR): on biosynthesis. K. T. Poroshin, Yu. I. Khurgin, T. D. Kozarenko, N. I. Prokhorov, N. B. Noskov (USSR): on polycondensation of  $\alpha$ -aminoacid esters in the presence of  $\text{CO}_2$ ; A. V. Volokhina, G. I. Kudryavtsev, S. M. Skuratov, A. K. Bonetskiy on polyamidization in solid phase. J. A. Mikes (Hungary) reported on condensation resins obtained from furfurole, phenol, and their derivatives, and formaldehyde. M. S. Akutin, L. A. Rodovilova, N. V. Mikhaylov, V. I. Mayborod, S. S. Nikolayeva (USSR), and L. A. Alexandru, L. D. Dascalu (Roumania) talked about interface polycondensation. F. Lešek, R. Hroměček (CSR) reported on the process of suspension polymerization and its physicochemical description; A. A. Blagonravov, G. A. Levkovich, I. A. Pronin (USSR) on the catalytic effect of  $\text{ZnO}$  in the synthesis of polyurethanes. The Second Section dealt with processes of polymerization and polycondensation. 59 lectures were given in six sessions. S. Ye. Bresler, E. N. Kazbekov, Ye. M. Saminskiy (USSR) reported on studies on the reactivity of macroradicals by epr; Kh. S. Bagdasaryan, Z. A. Sinitsina (USSR) and F. Tüdes, I. Kende, M. Azori (Hungary): on the inhibition of radical polymerization by aromatic compounds; G. A. Razuvayev, L. M. Terman, V. R. Likhterov, V. S. Etlis (USSR) on the

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The International Symposium...

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B101/B215

A. Ye. Kulikova, N. M. Teplyakov (USSR): Polyesters and their oligomers. M. M. Koton (USSR) gave a survey on the synthesis of new polymers with rings in their chains. A. A. Vansheydt, Ye. P. Mel'nikova, M. G. Krakovyak, L. V. Kukhareva, G. A. Gladkovskiy (USSR): Synthesis and properties of crystalline polymers type poly-p-xylylene and polyphenyl methyl. S. G. Matsoyan, I. A. Arbuzova, Ye. N. Rostovskiy (USSR) on: synthesis of polyvinyl acetals. V. V. Korshak, S. L. Sosin, V. P. Alekseyeva (USSR) on the synthesis of new, linear polymers containing aromatic rings. K. A. Andrianov (USSR): "Polymers with inorganic chains in the molecules". N. S. Nametkin, A. V. Topchiyev, S. G. Durgar'yan (USSR) reported on organo-silicon polymers obtained by Ziegler catalysts of allyl silanes by copolymerization with propylene. G. S. Kolesnikov, S. L. Davydova, N. V. Klimentova, M. F. Shostakovskiy, S. P. Kalinina, V. N. Kotrelev, D. A. Kochkin, G. I. Kuznetsova, L. V. Layne, A. I. Borisova, V. V. Borisenko (USSR): on the synthesis, polymerization and copolymerization of organogermanium and organo tin methacrylates and dimethacrylates. M. M. Koton, T. M. Kiseleva, F. S. Florinskiy (USSR): on organometallic tin and lead compounds. E. Thilo (Eastern Germany): "Essential characteristics of the chemistry of inorganic polymers".

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The International Symposium...

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Soveta Ministrov SSSR po khimii (State Committee of Chemistry of the Council of Ministers USSR), A. N. Nesmeyanov, Academician, and I. G. Petrovskiy, Academician, Director of the Moscow University welcomed the delegates. V. A. Kargin, Academician, chairman of the Organization Committee gave a survey on the main problems of polymer chemistry in his opening speech. Second plenary session: N. N. Semenov, Academician: "The collective interaction in processes of polymerization at low temperatures and in polymers with conjugate bonds". The First Section dealt with problems of synthesizing polymers. Lectures by Soviet-bloc scientists: Ye. A. Mushina, A. I. Perel'man, A. V. Topchiyev, B. A. Krentsel' (USSR) talked about synthesizing stereoregular polymers of ring-containing  $\alpha$ -olefins. Ye. I. Tinyakova, B. A. Dolgoplosk, T. G. Zhuravleva, R. N. Kovalevskaya, T. N. Kuren'gina (USSR): On the synthesis of cis- and transpolymers of dienes on oxide catalysts. A. V. Golubeva, N. F. Usmanova, A. A. Vansheydt (USSR): Synthesis of copolymers from styrene,  $\alpha$ -methyl-styrene, and vinyl naphthalene. T. Ya. Kefeli, G. V. Korolev, Yu. M. Filippovskaya (USSR): On polyester acrylate. The synthesis of these polymers had been developed under the supervision of A. A. Berlin. M. Bogdanecky, I. Mleziva, A. Sternschuss, V. Zvonar (CSR): Copolymerization of styrene with unsaturated polyesters. Ye. N. Zil'berman,

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S/190/61/003/002 '012/012  
B101/B215

AUTHORS: Kozlov, P. V., Kabanov, V. A., Plate, N. A.

TITLE: The International Symposium on Macromolecular Chemistry in Moscow

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 3, 1961, 328-348

TEXT: This is a report on the 14th Symposium on Macromolecular Chemistry, held in Moscow on the suggestion of the USSR and decision of the IUPAC (International Union of Pure and Applied Chemistry), June 14th-18th, 1960. Subject was: synthesis of macromolecular compounds and chemical transformation in polymer chain molecules. There were 1136 delegates and 279 guests. 846 of the delegates came from the USSR. Altogether 170 lectures and reports were given, 64 of which were attended and discussed by Soviet research workers. Two plenary sessions and 18 sessions of the three sections took place. 8 sessions were held on one day of free discussion. The symposium was opened by the plenary session held in the great hall of the Moskovskiy gosudarstvennyy universitet (Moscow State University). V. S. Fedorov, Chairman of the Gosudarstvennyy Komitet

Card 1/10

Ordering processes in systems...

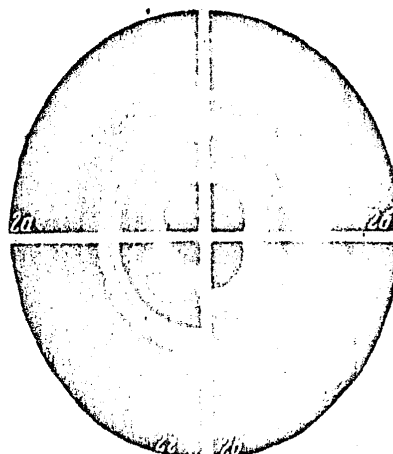
89591

S/190/61/003/002/009/012  
B101/B215

Legend to Fig. 2: Radiographs.

2a) mixture of isotactic PS  
and grafted copolymer immediately after reprecipitation;  
2c) ditto after crystallization;  
2d) fraction soluble in methylethyl  
ketone; 2e) fraction insoluble in  
methyl-ethyl ketone.

[Abstracter's note: the other  
photographs are not reproducible].



Card 4/4

Ordering processes in systems...

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B101/B215

The 3 references to English language publications read as follows:  
H. C. Haas, S. J. Cohen, A. C. Oglesby, E. R. Carlin, J. Polymer Sci.,  
15, 427, 1955; P. H. Till, J. Polymer Sci., 24, 301, 1957; W. D.  
Niegisch, J. Polymer Sci., 40, 263, 1959.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: August 1, 1960

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Ordering processes in systems ...

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up to 140°C. The mixture of crystalline and grafted copolymers then showed a variety of intermediate stages between spherulitic and crystalline formations whose thickness was 150-200 Å. Fibrils (40-50 Å) became visible after heating up to 160°C. With tetralin as solvent, distinct packet structures occurred (250-400 Å). The presence of the copolymer thus inhibits crystallization and causes a variety of intermediate formations. To study the fine structure of the pure copolymer, crystalline PS additions were precipitated from tetralin by methanol, and boiled in heptane for 30 hr. After this reprecipitation the product, originally insoluble in methyl-ethyl ketone, has become soluble up to 40%. Hence, it was concluded that grafting only takes place on the surface of the crystal packages of insoluble, isotactic PS under heterogeneous conditions. The solubility of the product depends on whether the isotactic main chain remains in direct neighborhood of the macromolecules of crystalline PS which did not enter into reaction. Fig. 2 shows the radiographs taken during separation by recrystallization. The electron-microscopical examination of the pure, grafted copolymer showed coiled globules of 40-50 Å. The authors thank N. F. Bakeyev for collaboration and discussion. There are 3 figures and 16 references: 9 Soviet-bloc and 7 non-Soviet-bloc.

Card 2/4

15.8600 2209

S/190/61/003/002/009/012  
B101/B215

AUTHORS: Kargin, V. A., Shibayev, V. P., Plate, N. A.

TITLE: Ordering processes in systems containing grafted copolymers on the basis of isotactic and atactic polystyrene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 2, 1961, 299-305

TEXT: It was the purpose of the present work to study the influence of grafting on the ordering processes and crystallization in polymer systems by electron microscopes. Grafted copolymers obtained from isotactic and atactic polystyrene (PS) were used for the investigation. The content of the atactic component was 17% in one sample and 35% in the other. A JEM-5Y electron microscope with direct, 20,000-70,000-fold electron-optical magnification was used for the experiments. The crystallization of polymers dissolved in toluene (concentration of 0.01%) was conducted at 110°C on colloxylin film hardened by quartz or coal. The first electron-microscopical photographs showed no difference between copolymer and crystalline PS. For finding the difference, the film had to be heated

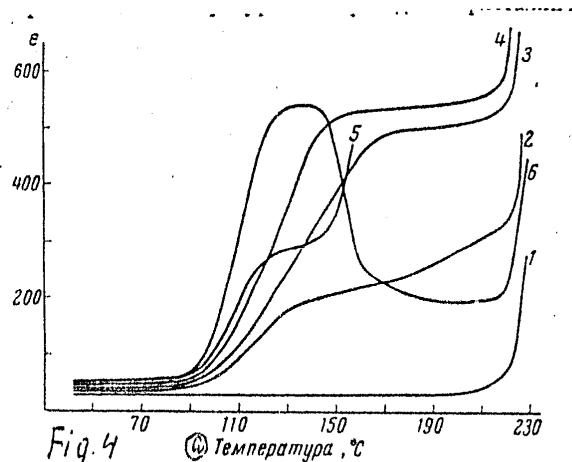
Card 1/4

Synthesis and properties of grafted...

S/190/61/003/002/008/012  
B101/B215

Legend to Fig.4: Dependence of deformation on temperature.

- 1) Crystalline isotactic PS;
- 2) graft copolymer (35 : 65);
- 3) ditto (31 : 69); 4) ditto (17 : 83);
- 5) atactic PS;
- 6) amorphous isotactic PS;
- a) temperature, °C.



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# Synthesis and properties of grafted...

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B101/B215

Legend to Fig.2: Curves of turbidimetric titration. 1) Atactic PS; 2) mechanic mixture of 35% of atactic and 65% of isotactic PS; 3) grafted copolymer (35 : 65); 4) isotactic PS.

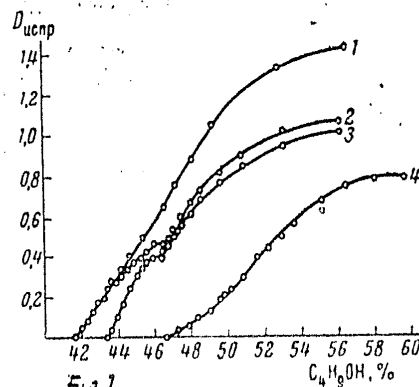


Fig. 2

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Synthesis and properties of grafted...

S/190/61/003/002/008/012  
B101/B215

Legend to the table: Ozonization of isotactic polystyrene:  
 1) no. of the experiment;  
 2) state of aggregation of the polymer; 3) time of ozonization, hr; 4) rate of flow of ozone, l/hr; 5) content of  $O_2$ , %;  
 6) powder; 7) ditto; 8) film.

Озонирование изотактического полистирола

Опыт	Агрегатное состояние полимера	Продолжительность озонирования, часы	Скорость пропускания озона, л/час	Содержание $O_2$ , %
①	②	③	④	⑤
1	Порошок	0	0	0,5
2	То же	1	10	1,10
3	" "	2	10	2,33
4	" "	3	10	4,1
5	" "	4	10	5,78
6	Пленка	4	6-7	0,0
7	То же	4	20	0,5
8	" "	8	20	до 1

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Synthesis and properties of grafted...

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B101/B215

showed that grafting of 17% of the atactic component did not change the diffraction of isotactic PS. 31% of the atactic component showed wider diffraction lines. The examination of copolymers of crystalline and amorphous components is considered to be an important problem. I. Yu. Marchenko (Ref.13: Vysokomolek. soyed., 2, 549, 1960) is mentioned. There are 5 figures, 1 table, and 13 references: 9 Soviet-bloc and 4 non-Soviet-bloc. The reference to English language publication reads as follows: Y. Landler, Materials of the Gordon Scientific Conference, USA, 1958.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: August 1, 1960

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B101/B215

## Synthesis and properties of grafted...

contents of atactic components were obtained. Fig. 2 shows a diagram of turbidimetric titration of atactic polystyrene, mechanic mixtures of 35% of atactic plus 65% of isotactic PS, grafted copolymer with 35% of an atactic component, and isotactic PS (solvent: tetralin, precipitant: butanol). The solubility of the grafted copolymer was lower than that of the linear isotactic PS due to larger macromolecules, but higher than that of atactic PS due to the formation of branched chains. The determination of intrinsic viscosity showed the following results: the initial isotactic PS had a Huggin's constant  $k' = 0.10$ .  $k'$  of the grafted copolymers was 0.40, and  $k'$  of copolymers with different contents of atactic components, in agreement with J. A. Manson, L. H. Gragg (Ref.12: Angew. Chem. 67, 32, 1955), showed no remarkable differences. Fig. 4 gives the thermomechanical properties of the copolymers. The grafted copolymers were found to have a distinct vitrification temperature ( $90^{\circ}\text{C}$ ), and a high melting point ( $220-230^{\circ}\text{C}$ ) characteristic of isotactic PS. This is explained by the fact that the structural order of the isotactic component is preserved in the copolymer. Within these two temperatures, the copolymers showed the ability of reversible, highly elastic deformation which was not accompanied by recrystallization. A radiographic analysis

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B101/B215

## Synthesis and properties of grafted...

Ozonization was conducted in a glass vessel. The experimental conditions are given in a table. After the reaction,  $N_2$  was blown through the apparatus, and evacuated at room temperature; the content of active  $O_2$  in the sample was determined by elementary analysis. Ozonization of PS films was less effective due to the difficult diffusion of ozone. In agreement with P. Lebel (Ref.10: Thesis, Paris 1957), the infrared spectrum showed no OH bands thus proving the absence of hydrogen peroxide. Peroxide of experiment no. 5 (see table) served as initiator for the polymerization of atactic styrene monomer. The latter was carried out in phials, either in argon atmosphere or in high vacuum. The optimum was found to be: 1 hr of heating up to  $60^\circ C$ , then 2 hr up to  $65^\circ C$ , 3 hr up to  $70^\circ C$ , and finally 2 hr up to  $75^\circ C$ . Faster increase in temperature led to the formation of network. In solutions (benzene, toluene), polymers of lower degrees of grafting were obtained. Atactic homopolystyrene (side product of the reaction) was removed by a 10 - 15 hr treatment with methyl-ethyl ketone. The molecular weight of the product was 200,000. Grafted copolymers with 17, 31, and 35%

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S/190/61/003/002/008/012  
B101/B215

15.8600 2209

AUTHORS: Plate, N. A., Shibayev, V. P., Patrikeyeva, T. I.,  
Kargin, V.A.

TITLE: Synthesis and properties of grafted copolymers of isotactic  
and atactic polystyrene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 2, 1961,  
292-298

TEXT: In previous papers, the authors together with other collaborators,  
(Refs.1-4: Vysokomolek. soyed. 1, 114, 1959; 1, 1101, 1959; 1, 1547, 1959;  
2, 166, 1960) studied grafted copolymers of chemically and physically  
different components. The present paper reports on the examination of  
grafted copolymers consisting of chemically equal chains which are  
different in structure: copolymers with crystalline, isotactic poly-  
styrene main chains, and amorphous, atactic polystyrene side chains.  
They were produced by ozonization of isotactic polystyrene (PS) whose  
atactic fraction was washed out by boiling methyl-ethyl ketone. The  
fraction insoluble in this solvent, had a molecular weight of 80,000.

Card 1/7

BELIKOVA, N.A.; KARGIN, V.A.; PLATE, A.F.; PLATE, N.A.; TAYTS, G.S.;  
LYAMINA, I.N.

Synthesis and polymerization of 2-vinylbicyclo-(2,2,1)-heptane.  
Neftekhimiia 1 no.2:218-223 Mr-Apr '61. (MIRA 15:2)

1. Moskovskiy gosudarstvennyy universitet im. Lomonosova i  
Institut organicheskoy khimii AN SSSR im. N.D. Zelinskogo.  
(Norbornane) (Polymerization)

KARGIN, V.A.; KABANOV, V.A.; PLATE, N.A.; PAVLICHENKO, N.P.

Plasticization of block copolymers of acrylic acid and styrene.  
Vysokom. soed. 2 no. 3:433-440 Mr '60. (MIKA 13:11)

1. Moskovskiy gosudarstvennyy universitet, Khimicheskiy  
fakul'tet.

(Acrylic acid) (Styrene) (Polymers)

# PHASE I BOOK EXPLORATION NOV/4983

International symposium on macromolecular chemistry. Moscow, 1960.

Mezhdunarodnyy simpozium po makromolekulyarnoy khimii, SSSR, Moskva, 14-13 Iyunya 1960 g. doklady i stenoformy. Sektsiya II. (International Symposium on Macromolecular Chemistry Held in Moscow, June 14-13; Papers and Stenoforms) Section II. [Moscow, Izdatvo AN SSSR, 1960] 599 p. 5,500 copies printed.

Sponsoring Agency: The International Union of Pure and Applied Chemistry, Commission on Macromolecular Chemistry

Tech. Ed.: T.A. Prusakova.

FOROER: This book is intended for chemists interested in polymerization reactions and the synthesis of high-molecular compounds.

COVERAGE: This is Section II of a multivolume work containing papers on macromolecular chemistry. The papers in this volume treat mainly the kinetics of various polymerization reactions initiated by different catalysts or induced by radiation. Among the research techniques discussed are electron paramagnetic resonance spectroscopy and light-scattering interpolation. There are summaries in English, French and Russian. No personalities are mentioned. Entries follow each article.

- Martin, Y.A., and H.A. Platz (USSR). Processes of Polymerization and Grafting on Newly Formed Surfaces 460
- Volobina, A.V., G.I. Kabanov, S.M. Shurakov, and A.I. Bonetskaya (USSR). The Polymerization Process in the Solid Phase 465
- Chelish, E., A. Szabo, Z. Holli, and H. Schlatte (Hungary). Mechanism of the Polymerization of  $\alpha$ -Cyanopropene in the Presence of Phosphoric Acid 467
- Chernomir, S., B. Oskarski, and Vlodimirov (Poland). Polymerization of Carbonium, Ketonolactone and Caprolactone in the Presence of Their Solids 477
- Salat in Nonpolar Solvents With Carbon Dioxide As an Activator 477
- Vascoe-Smerciari, L.K. Marcus-Greiner and E. Makay-Bod (Hungary). Investigation of Halogenoformate Isomerization During the Polymerization of Different Olefins 503
- Lesocki, Z., and S. Chruszczak (Poland). Kinetics of the Polymerization of Dimethylsilanediol 503
- Kratochvil, P., Mink, and B. Sedláček (Czechoslovakia). Use of the Spectroscopic Method in Computing Data on Light Scattering for the Case of Continuous Constant Observation of Polymerization in Particles 521
- AVAILABLE: Library of Congress

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- Bresler, S.Ye., M.I. Kiselevich, I. Ya. Polubnyy, and S.M. Krasov (USSR). Study of Some Details of the Mechanism of Polymerization Under the Action of Complex Catalysts 572
- Severson, V.M., S.Ye. Malyuk, A.M. Buzikova, and M.D. Gerasim (USSR). Stereospecificity and the Optical Properties of Polymers 575
- Rimsteyn, J.M., Yu. Ye. Gorbil, and O.R. Pribludnyy (USSR). The Microviscosity of Polymers and Methods of Study 583
- Abdel-Aziz, A.P., Shakhmat, M.K. Yakovleva, and L.P. Melnikova (USSR). On Carbonium and Carbocation Polymerization Mechanisms Under the Effects of Gamma Radiation 583
- Carothers, V.A., and V.A. Fakhov (USSR). Polymerization Processes in Carbocation Molecular Dispersions 583
- Mandak, Z., I. Melnik, and I. Péc (Czechoslovakia). Kinetics of the Polymerization of Formaldehyde 583
- Vasely, K. (Czechoslovakia). On the Mechanism of Ionic Polymerization 583
- Klinal, Z., and A. Farka (Czechoslovakia). On the Role of Simple Compounds in the Cationic Polymerization of Isobutylene 583

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Electric Properties of Systems Consisting  
of Polymers and Metals

S/020/60/132/05/46/069  
B004/B011

ASSOCIATION: Institut elektrokhemii Akademii nauk SSSR (Institute of  
Electrochemistry of the Academy of Sciences, USSR)

PRESENTED: February 24, 1960, by A. N. Frumkin, Academician

SUBMITTED: February 24, 1960

✓

Card 3/3



Electric Properties of Systems Consisting  
of Polymers and Metals

S/020/60/132/05/46/069  
B004/B011

$\log \sigma$  ( $\sigma$  = electrical conductivity) on  $1/T$  of a sample with 20% of rubber was linear between  $+50^{\circ}\text{C}$  and  $-40^{\circ}\text{C}$ , as is typical of semiconductors. The thermo-emf ( $5 \mu\text{V}/\text{deg}$ ) and the Hall constant had the same sign as p-type semiconductors. Similar results were obtained with iron and polystyrene. In order to obtain a more uniform distribution of the polymer, the iron was subjected to a vibrational grinding process in monomeric medium according to the method devised by V. A. Kargin and N. A. Plate. The monomers used were isoprene, styrene, methyl methacrylate, and acrylonitrile. Polymerization occurred in consequence of vibrational grinding. The results (Table 1, Fig. 1) show that in this case the thermo-emf and the Hall constant had the sign of the n-type semiconductors. It is concluded therefrom that in vibrational grinding, beside the more uniform distribution, there occurs also another type of bond between metal and organic substance. The authors mention papers by R. Kh. Burshteyn, M. I. Pavlova, and S. L. Kiperman (Refs. 6, 7), N. A. Shurmovskaya and R. Kh. Burshteyn (Ref. 8), and thank A. N. Frumkin, Academician, V. A. Kargin, Academician, and R. Kh. Burshteyn, Professor, for their assistance and advice. There are 1 figure, 1 table, and 9 references: 7 Soviet and 2 British.

Card 2/3

4

S/020/60/132/05/46/069  
B004/B011

24.7700

AUTHORS: Levina, S. D., Lobanova, K. P., Plate, N. A.

TITLE: Electric Properties of Systems Consisting of Polymers and Metals

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 5, pp. 1140-1143

TEXT: The authors proceed from papers by A. T. Vartan'yan (Refs. 1, 2), A. V. Topchiyev, M. A. Geyderikh, B. E. Davydov, V. A. Kargin, et al. (Ref. 5) who had dealt with the influence of the introduction of metal atoms in polymers on their physical properties. The authors wanted to study the electric properties of compositions in which the metal particles are surrounded by a nonconductive polymeric layer. The problem was to be solved whether electron transitions are possible under such conditions. The authors used highly disperse iron powder which was obtained from iron oxide by reduction by means of hydrogen at 450-500°C, and passivated by dipping into benzene. Plates were pressed from iron powder and polyisoprene (natural rubber) for the first experiments. The dependence of

Card 1/3

KARGIN, V.A.; PLATE, N.A.; SHIBAYEV, V.P.

Plasticization of polyvinyl alcohol - styrene and polyacrylic  
acid-styrene graft copolymers. *Vysokom.sood.* 2 no.1:166-173  
Ja '60. (MIRA 13:5)

1. Moskovskiy gosudarstvennyy universitet. Khimicheskiy  
fakul'tet.  
(Styrene) (Vinyl alcohol) (Acrylic acid)

PLATE, N.A.; SHIBAYEV, V.P.; KARGIN, V.A.

Some methods of synthesizing graft polymers. Vysokom.sped.  
1 no.12:1853-1858 D '59. (MIRA 13:5)

1. Moskovskiy gosudarstvennyy universitet. Khimicheskiy fakul'-  
tet.

(Polymers)

PLATE, N.A.

London convention on plastics. Vysokom.sped. 1 no.11:1749-1784  
N '59. (MIRA 13:6)

(Plastics--Congresses)

PLATE, N.A.; PROKOPENKO, V.V.; KARGIN, V.A.

Polymerization of certain monomers during the dispersion of  
inorganic substances. Vysokom.soed. 1 no.11:1713-1720 N  
'59. (MIRA 13:5)

1. Khimicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta  
imeni M.V. Lomonosova.  
(Polymerization) (Styrene) (Methacrylic acid)

KARSEN, V.A.; et al.

Chemical adsorption on crystalline surfaces. *Vysokomol. soed.* 1 no.2:  
330-331 (1959) (MIRA 12:10)

1. Khiz'matov, I. I. *Fakul'tet Moskovskogo gosuniversiteta im. M.V.*  
*Lomonosova, Khim. i fiz. vysokomolekulyarnykh soedineniy.*  
(Polymers)

KARGIN, V.A.; PLATE, N.A.; REBINDER, Ye.P.

Certain properties of starch and methyl methacrylate graft  
copolymers. Vysokom.soed. 1 no.10:1547-1551 0 '59.  
(MIRA 13:3)

1. Khimicheskiy fakul'tet Moskovskogo gosudarstvennogo  
universiteta, kafedra vysokomolekulyarnykh soyedineniy.  
(Starch) (Methacrylic acid) (Polymers)



KOZLOV, P.V.; IOVLEVA, M.M.; PLATE, N.A.

Obtaining polystyrene-acrylic acid graft polymers and investigating  
some of their properties. Vysokom. speed. 1 no.7:1100-1105 J1 '59.  
(MIRA 12:11)

1. Moskovskiy gosudarstvennyy universitet.  
(Styrene) (Acrylic acid)

KARGIN, V.A.; ~~PLATE~~, N.A.; DUDNIK, L.A.

Polymer obtained from bicyclo-[2,2,1]-heptadiene. Vysokom. soed. 1  
no.3:420-424 Mr '59. (MIRA 12:10)

1. Khimicheskiy fakul'tet Moskovskogo gosuniversiteta.  
(Polymers) (Bicycloheptadiene)

KARGIN, V.A.; KOZLOV, P.V.; PLATE, N.A.; KONOREVA, I.I.

Method of obtaining graft polymers from starch and styrene and  
investigation of their properties. Vysokom.sosd. 1 no.1:114-122  
Ja '59. (MIRA 12:9)

1. Khimicheskii fakul'tet Moskovskogo gosudarstvennogo universiteta  
im. M.V.Lomonosova, Kafedra vysokomolekulyarnykh soyedineniy.  
(Styrene) (Starch) (Polymers)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R001341200037-6

PLATE, N. A., Cand of Chem Sci -- (diss) "Binding Copolymers and Their Physico-chemical Properties," Moscow, 1959, 12 pp (Moscow State Univ in Lomonosov) (KL, 5-6, 123)

76-32-3-6/43

The Physicochemical Investigation of the Structure and Properties of the  $\omega$ -Polymer of Chloroprene

of impurities (neozone, thioram) within the industrial product  $\omega$ -polymer. Tests, which were performed by means of an irradiation with  $\gamma$ -rays ( $\text{Co}^{60}$ ), show that in  $\omega$ -polymers no change of the sorptive power takes place, whereas in  $\alpha$ -polymers, the sorptive power decreased. The obtained experimental results agree with the assumption of A. N. Pravednikov and S. S. Medvedev on the structure of  $\omega$ -polymers. There are 6 figures and 13 references, 8 of which are Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova, Moskva (Institute for Physical Chemistry imeni L. Ya. Karpov, Moscow State University imeni M. V. Lomonosov, Moscow)

SUBMITTED: August 7, 1956

Card 3/3

76-32-3-6/43

The Physicochemical Investigation of the Structure and Properties of the  $\omega$ -Polymer of Chloroprene

mer apparently possesses a more dense spatial structure than the  $\mu$ -polymer, by means of which it is more inelastic and therewith possesses a greater elasticity modulus. In this case also, a certain lattice potential is assumed. The temperature treatment of  $\alpha$ - and  $\mu$ -polymers produces thermal vulcanization, whereas the size of the high-elasticity modulus increases almost to that of the  $\omega$ -polymer. For the  $\omega$ -polymer, no thermal vulcanization takes place. This confirms the presence of a dense space lattice structure. The thermomechanical frequency-load tests pointed to a sparse space lattice structure in the  $\mu$ -polymer, as well as to a linear structure in the  $\alpha$ -polymer. Investigations of the sorption isothermal lines were performed in high vacuum, under application of the spring scale according to Mac-Ben, at 25°C. The near coincidence of the sorption isothermal lines of the  $\alpha$ - and  $\mu$ -polymers is observed. Hence it is concluded that the  $\mu$ -polymer possesses a relatively sparse lattice structure, which fact, according to T. V. Gatovska, does not change the elasticity of the rubber molecules, whereas the small difference between the two sorption isothermal lines is explained by the presence

Card 2/3

76-32-3 6/43

**AUTHORS:** Kargin, V. A.; Plate, N. A.

**TITLE:** The Physicochemical Investigation of the Structure and Properties of the  $\omega$ -Polymer of Chloroprene (Fiziko-khimicheskoye issledovaniye stroyeniya i svoystv  $\omega$ -polimera khloroprena)

**PERIODICAL:** Zhurnal Fizicheskoy Khimii, 1958, Vol 32, Nr 3, pp 528-533 (USSR)

**ABSTRACT:** Among the investigations performed in the field of  $\omega$ -polymerization, the assumptions of A. N. Pravednikov and S. S. Medvedev (Ref 5) are emphasized. In the present paper structural, thermomechanical, thermodynamic, and other determination methods were applied. The  $\omega$ - and  $\mu$ -polymers of the chloroprene to be investigated were obtained according to an earlier described method in high vacuum. In parallel tests, a soluble linear product (called  $\alpha$  polymer) from industrial synthetic chloroprene rubber of the type "Nairit 966" of the year 1955 was used. The radio and electronographic determinations showed that the  $\omega$ - and  $\mu$ -polymers possess an amorphous structure and an identical chain structure. During investigations of the deformation dependence on temperature, it was observed that the  $\omega$ -poly-

Card 1/3

69-20-3-15/24

Some Properties of Block Copolymers on the Base of an Epoxide Resin and  
Butadiene Nitrile Rubber

the produced copolymers have similar thermomechanical properties to rubber. They maintain their high-elastic properties within a broad temperature range. The mechanical properties of the block copolymers of the resin ED-15 and the rubber SKN-26 are an addition of the properties of the individual components.

There are 6 graphs and 13 references, 4 of which are Soviet, 7 English, 1 German, and 1 French.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova,  
Khimicheskii fakul'tet (Moscow State University imeni M.V.  
Lomonosov, Department of Chemistry)

SUBMITTED: December 10, 1957

Card 2/2

1. Rubber--Copolymerization--Properties--Analysis



69-20-3-15/24

AUTHORS: Kargin, V.A.; Plate, N.A.; Dobrynina, A.S.

TITLE: Some Properties of Block-Copolymers on the Base of an Epoxide Resin and Butadiene Nitrile Rubber (O nekotorykh svoystvakh blok-sopolimerov na osnove epoksidnoy smoly i butadiyennitril'nogo kauchuka)

PERIODICAL: Kolloidnyy zhurnal, 1958, vol XX, Nr 3, pp 552-557 (USSR)

ABSTRACT: Block copolymers were produced by cold mastication of epoxide resin and butadiene nitrile rubber. The epoxide resin ES-15 and the butadiene nitrile rubber SKN-26 were mixed in the ratios 5:1; 2:1; 1:1; 1:2; 1:5 and processed for 5-7 minutes at room temperature in a nitrogen atmosphere. The thermomechanical properties of the copolymer were compared with those of its components. Figures 2, a and b, show that the thermomechanical properties in both substances are very similar. The temperature of vitrification is somewhat increased in the mixtures 1:1 and 2:1. The modulus of the highly-elastic state is increased in the copolymer, i.e. the rubber SKN-26 is toughened during mastication. During mastication the block copolymers take up more rubber compared with the initial components. Although the resin content is 39%,

Card 1/2

PLATE C2.

2687

637.354.37 : 637.183.3

Platé Cz., Jakubowski J. The Manufacture of Tilsit Cheese Containing 40% Fat in Dry Matter from Pasteurised Milk.

AG

„Wyrób sera tyłżyckiego o zawartości 40% tłuszczu w suchej masie z mleka pasteryzowanego”. (Prace Inst. Przem. Mlecz. No. 1), Warszawa, 1954, WPLIS/7 pp., 3 figs., 5 tabs.

Experiments were carried out over the manufacture of Tilsit cheese from pasteurised milk. 28 parallel batches were made, from both pasteurised and non-pasteurised milk. The pasteurisation was made at 72—

75°C over a period of 18 seconds. The butter starter was used, its dosage determined. With the pasteurised milk the necessity of thorough crumbling of the clot and better draining of the cheese kernels was observed. Special care must be taken to prevent the reinfection of the pasteurised milk. Using the above method, cheese of I and II grade was obtained. The conclusion reached was that for cheese manufactured from the pasteurised milk, special starters typical for each type of cheese should be used.

①

PLATE, Cz

3685

637.352

Jakubowski J., Plate Cz. The Use of Putrid Curd for the Production of Casein.

AG

„Wykorzystanie zglutowanego twarogu do wyrobu kazeiny". (Prace Inst. Przem. Mlecz. No. 2), Warszawa, 1954, 3.5 pp., 2 tabs.

A discussion of chemical changes taking place in curd during its putridity. A number of tests were conducted on a laboratory and technical scale tending to remove products of protein decomposition by rinsing in water, in acidified whey and again in water, as also by applying chemical regeneration consisting of dissolving in NaOH and precipitating with mineral acid. Positive results were obtained only when using acidified

whey. Curd cleansed by this method could be used for the production of casein for industrial purposes.

①

PLATE, A. S.

"A Complex Method of Detailed Investigation of the Individual Composition of Gasolines"  
(Kompleksnyy Method Detalizirovannogo Issledovaniya 'individual'nogo Sostava Benzinov),  
G. S. Landsberg, B. A. Kazanskiy, P. A. Bazhulin, M. I. Batuyev, A. L. Liberman,  
A. S. Plate, and G. A. Tarasova, edited by V. S. Fedorov, <sup>U</sup>ostoptekhzdat, Moscow/  
Leningrad, 1949, 68 pages, 3 rubles

Subject Method is based on spectral analysis.

SO: Uspekhi Khimii, Vol 18, #6, 1949; Vol 19, #1, 1950 (W-10083)

BA

H-11

Hydrocarbons of the cyclopentane series with a double bond in the side-chain. II. Vinylcyclopentane. A. P. Plate, P. N. Shafran, and M. I. Batuyev (*J. gen. Chem. USSR*, 1950, 20, 472-479 [U.S. transl., 505-511]).—Dehydrating the acetate of 1- or 2-cyclopentylethanol by pyrolysis furnishes vinylcyclopentane, the structure of which is established by its chemical behaviour and by the frequencies of the combined light-scattering spectrum which are listed.

Mg cyclopentyl chloride (I) and MeCHO furnish 1-cyclopentylethanol,  $C_6H_{10}O$  (83%), b.p. 73-76°/32-30 mm.,  $d_4^{20}$  0.9228,  $n_D^{20}$  1.4580, which yields its acetate,  $C_8H_{14}O_2$  (84%), b.p. 78-79°/24 mm., 179-188°/746 mm.,  $d_4^{20}$  0.9408,  $n_D^{20}$  1.4561, when mixed with  $Ac_2O$  and gradually treated with  $H_3PO_4$  (d 1.7)- $Ac_2O$  (prepared overnight) at >38°. Ethylene oxide and I furnish 2-cyclopentylethanol,  $C_6H_{10}O$  (77%), b.p. 94-96°/24 mm.,  $d_4^{20}$  0.9190,  $n_D^{20}$  1.4576, similarly transformed into the acetate,  $C_8H_{14}O_2$ , b.p. 98-100°/34-35 mm., 193-198°/742 mm.,  $d_4^{20}$  0.9541,  $n_D^{20}$  1.4399.

Pyrolysis of the acetates by passage in a slow stream of  $N_2$  over glass wool contained in a Mo glass tube heated to 500° gives vinylcyclopentane,  $C_6H_{10}$  (II) (>80%), b.p. 98.2-98.5°/780 mm.,  $d_4^{20}$  0.7766,  $n_D^{20}$  1.4368, hydrogenated in presence of Pt-C to ethylcyclopentane, b.p. 103.3-103.4°/786 mm.,  $d_4^{20}$  0.7867,  $n_D^{20}$  1.4191. Oxidation of II with cold 1%  $KMnO_4$  gives  $H_2CO_3H$  and cyclopentanecarboxylic acid, b.p. 218-220°,  $d_4^{20}$  1.0597,  $n_D^{20}$  1.4548; neutral products are not obtained.

H. WERN.

VERGUDOV, G.V.

PERMUGUDOV, G.V.; MARKOVA, S.V.; BAZHULINA, P.A.; PLATE, A.G.; TERENT'YEVA, Ye.M.

Optical method of studying hydrocarbons. Report No.10: Raman spectra  
of some naphthenes. Izv. AN SSSR. Otd. khim. nauk no.1:37-42 Ja '57.  
(MLBA 10:4)

1. Fizicheskiy institut im. P.N. Lebedeva Akademii nauk SSSR i Insti-  
tut organicheskoy khimii im. N.D. Zelinskego Akademii nauk SSSR.  
(Naphthenes--Spectra)

Investigation of the polymerization <sup>31747</sup> S/204/61/001/004/005/005  
E075/E185

out at 72 °C in methylene chloride solution. It was found that for the pressure polymerizations the molecular weight and yields of the polymers increase with temperature. The same applies to the mechanical properties of the polymers. The polymer with the highest softening temperature was prepared at 200 °C. The polymerization under atmospheric pressures gave relatively low molecular weight polymers with low yields. Polycycloheptadiene obtained under pressure did not soften below 400 °C. The effects of pressure and temperature on the polymerization of cycloheptatriene are the same as for bicycloheptene but are more accentuated. Polycycloheptatrienes have the highest thermal stability and are all insoluble. The polymers obtained with  $TiCl_4$  as initiator have relatively low molecular weights and are obtained with low yields, but have similar thermal stabilities to the polymers obtained under pressure. Infrared spectra obtained for the monomers and polymers indicated that only very small proportion of double bonds are present in the polymers. X-ray examination indicates that all the polymers are amorphous.

Card 2/ 3

15.8063

31747  
S/204/61/001/004/005/005  
E075/E185

AUTHORS: Polyakova, A.M., Plate, A.F., Pryanishnikova, M.A.,  
and Lipatnikov, N.A.

TITLE: Investigation of the polymerization under pressure of  
some cyclic unsaturated hydrocarbons.  
bicyclo-(2,2,1)-heptane-2, bicyclo-(2,2,1)-heptadiene-  
2,5, and cycloheptatriene

PERIODICAL: Neftekhimiya, v.1, no.4, 1961, 521-527

TEXT: The polymerization of bicyclo-(2,2,1)-heptane 2,  
bicyclo-(2,2,1)-heptane 2,5 and cycloheptatriene was investigated  
under 6000 atm using tertiary butylperoxide as reaction initiator.  
An attempt was made also to evaluate relative reactivities of  
these hydrocarbons at atmospheric pressure in the presence of an  
ionic catalyst  $TiCl_4$ . The aim of this work was to obtain polymers  
possessing high thermal stability. The pressure polymerizations  
were carried out in lead ampules, and the corresponding  
experiments under atmospheric pressure in glass ampules.  
Temperature of the pressure polymerizations ranged from 130 to  
200 °C. The polymerizations with  $TiCl_4$  as initiator were carried  
Card 1/3



BALANDIN, Aleksey Aleksandrovich, akademik; GERASIMOV, Ya.I.,  
prof., retsenzent; PLATE, A.F., prof., retsenzent;  
AGRONOMOV, A.Ye., dots., red.

[Multiplet theory of catalysis] Multipl'etnaya teoriya  
kataliza. Moskva, Izd-vo Mosk. univ. Pt.2. 1964. 242 p.  
(MIRA 18:2)

1. Zaveduyushchiy kafedroy fizicheskoy khimii Moskovskogo  
gosudarstvennogo universiteta chlen korrespondent AN SSSR  
(for Gerasimov). 2. Zaveduyushchiy kafedroy khimii nefti  
Moskovskogo gosudarstvennogo universiteta (for Plate).

Catalytic conversions of ....

S/204/61/001/004/004/005  
E075/E185 ✓

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im.  
M.V. Lomonosova, Kafedra khimii nefii  
(Moscow State University imeni M.V. Lomonosova,  
Department of Petrol Chemistry)

SUBMITTED: June 10, 1961

Card 4/4

Catalytic conversions of ...

S/204/61/001/004/004/005  
E075/E185

3) Under platforming conditions the C--C bonds in the endomethylene bridges of 1,4,5,8-diendomethylenedecahydronaphthalene undergo cleavage, which is not typical for bicyclo-(2,2,1)-heptane and its homologs under conditions of hydrogenation and dehydrogenation catalysis.

Acknowledgments are expressed to Yu.P. Yegorov for his assistance. There are 1 figure, 1 table and 14 references: 5 Soviet-bloc and 9 non-Soviet-bloc. The four most recent English language references read as follows:

- Ref.2: C.L. Thomas, Ind. Eng. Chem., v.36, 310, 1944.
- Ref.3: S.B. Soloway, J. Amer. Chem. Soc., v.74, 1027, 1952.
- Ref.13: R.A. Friedel, M. Orchin. Ultraviolet spectra of organic compounds. J. Wiley, N.Y., 1951.
- Ref.14: Catalogue of infrared spectral data. Amer. Petrol. Inst., Research pr. 44, Nat. Bur. Stand., Washington, 1952.

Card 3/4